

WHAT IS CLAIMED IS:

1. An audio signal encoding apparatus comprising:
  - means for adding a first audio signal and a second audio signal  
5 into an addition-result signal;
    - means for subtracting the first audio signal from the second audio signal, and generating a subtraction-result signal;
    - means responsive to the addition-result signal for generating a first difference signal representing a difference in the addition-  
10 result signal;
      - means responsive to the subtraction-result signal for generating a second difference signal representing a difference in the subtraction-result signal;
      - a plurality of first predictors having different prediction  
15 characteristics respectively and being responsive to the first difference signal for generating first different prediction signals for the first difference signal, respectively;
      - a plurality of first subtracters for generating first prediction-error signals representing differences between the first difference  
20 signal and the first different prediction signals, respectively;
        - means for selecting a first minimum prediction-error signal representative of a smallest difference from among the first prediction-error signals;
        - a plurality of second predictors having different prediction  
25 characteristics respectively and being responsive to the second difference signal for generating second different prediction signals

for the second difference signal, respectively;

a plurality of second subtracters for generating second prediction-error signals representing differences between the second difference signal and the second different prediction  
5 signals, respectively; and

means for selecting a second minimum prediction-error signal representative of a smallest difference from among the second prediction-error signals.

10 2. An audio signal encoding apparatus as recited in claim 1, further comprising means for generating a variable-rate bit stream in response to the first minimum prediction-error signal and the second minimum prediction-error signal.

15 3. An audio signal decoding apparatus for processing a first minimum prediction-error signal and a second minimum prediction-error signal which are generated by an audio signal encoding apparatus comprising means for adding a first audio signal and a second audio signal into an addition-result signal; means for  
20 subtracting the first audio signal from the second audio signal, and generating a subtraction-result signal; means responsive to the addition-result signal for generating a first difference signal representing a difference in the addition-result signal; means responsive to the subtraction-result signal for generating a second  
25 difference signal representing a difference in the subtraction-result signal; a plurality of first predictors having different prediction

characteristics respectively and being responsive to the first difference signal for generating first different prediction signals for the first difference signal, respectively; a plurality of first subtracters for generating first prediction-error signals

5 representing differences between the first difference signal and the first different prediction signals, respectively; means for selecting a first minimum prediction-error signal representative of a smallest difference from among the first prediction-error signals; a plurality of second predictors having different prediction characteristics

10 respectively and being responsive to the second difference signal for generating second different prediction signals for the second difference signal, respectively; a plurality of second subtracters for generating second prediction-error signals representing differences between the second difference signal and the second different

15 prediction signals, respectively; and means for selecting a second minimum prediction-error signal representative of a smallest difference from among the second prediction-error signals; the audio signal decoding apparatus comprising:

means for recovering the addition-result signal from the first

20 minimum prediction-error signal;

means for recovering the subtraction-result signal from the second minimum prediction-error signal; and

means for recovering the first audio signal and the second audio signal from the recovered addition-result signal and the

25 recovered subtraction-result signal.

4. A method comprising the steps of:
  - adding a first audio signal and a second audio signal into an addition-result signal;
  - subtracting the first audio signal from the second audio signal,
  - 5 and generating a subtraction-result signal;
  - generating a first difference signal representing a difference in the addition-result signal;
  - generating a second difference signal representing a difference in the subtraction-result signal;
  - 10 generating first different prediction signals for the first difference signal, respectively;
  - generating first prediction-error signals representing differences between the first difference signal and the first different prediction signals, respectively;
  - 15 selecting a first minimum prediction-error signal representative of a smallest difference from among the first prediction-error signals;
  - generating second different prediction signals for the second difference signal, respectively;
  - 20 generating second prediction-error signals representing differences between the second difference signal and the second different prediction signals, respectively;
  - selecting a second minimum prediction-error signal representative of a smallest difference from among the second prediction-error signals; and
  - 25 transmitting the first minimum prediction-error signal and

the second minimum prediction-error signal to a communication line.

5. An optical recording medium storing formatted information of
- 5 a first minimum prediction-error signal and a second minimum prediction-error signal which are generated by an audio signal encoding apparatus comprising means for adding a first audio signal and a second audio signal into an addition-result signal; means for subtracting the first audio signal from the second audio signal, and
- 10 generating a subtraction-result signal; means responsive to the addition-result signal for generating a first difference signal representing a difference in the addition-result signal; means responsive to the subtraction-result signal for generating a second difference signal representing a difference in the subtraction-result
- 15 signal; a plurality of first predictors having different prediction characteristics respectively and being responsive to the first difference signal for generating first different prediction signals for the first difference signal, respectively; a plurality of first subtracters for generating first prediction-error signals
- 20 representing differences between the first difference signal and the first different prediction signals, respectively; means for selecting a first minimum prediction-error signal representative of a smallest difference from among the first prediction-error signals; a plurality of second predictors having different prediction characteristics
- 25 respectively and being responsive to the second difference signal for generating second different prediction signals for the second

difference signal, respectively; a plurality of second subtracters for generating second prediction-error signals representing differences between the second difference signal and the second different prediction signals, respectively; and means for selecting a second  
5 minimum prediction-error signal representative of a smallest difference from among the second prediction-error signals.

6. A method of network-based transmission, comprising the steps of:

10 adding a first audio signal and a second audio signal into an addition-result signal;

subtracting the first audio signal from the second audio signal, and generating a subtraction-result signal;

15 generating a first difference signal representing a difference in the addition-result signal;

generating a second difference signal representing a difference in the subtraction-result signal;

generating first different prediction signals for the first difference signal, respectively;

20 generating first prediction-error signals representing differences between the first difference signal and the first different prediction signals, respectively;

selecting a first minimum prediction-error signal representative of a smallest difference from among the first  
25 prediction-error signals;

generating second different prediction signals for the second

difference signal, respectively;

generating second prediction-error signals representing differences between the second difference signal and the second different prediction signals, respectively;

5        selecting a second minimum prediction-error signal representative of a smallest difference from among the second prediction-error signals; and

transmitting the first minimum prediction-error signal and the second minimum prediction-error signal to a communication  
10   line.

7.    An audio signal encoding apparatus comprising:

means for selecting a first audio signal and a second audio signal from among signals composing a multi-channel audio signal;

15        means for adding the first audio signal and the second audio signal into an addition-result signal;

means for subtracting the first audio signal from the second audio signal, and generating a subtraction-result signal;

means responsive to the addition-result signal for generating a  
20   first difference signal representing a difference in the addition-result signal;

means responsive to the subtraction-result signal for generating a second difference signal representing a difference in the subtraction-result signal;

25        a plurality of first predictors having different prediction characteristics respectively and being responsive to the first

difference signal for generating first different prediction signals for the first difference signal, respectively;

a plurality of first subtracters for generating first prediction-error signals representing differences between the first difference  
5 signal and the first different prediction signals, respectively;

means for selecting a first minimum prediction-error signal representative of a smallest difference from among the first prediction-error signals;

a plurality of second predictors having different prediction  
10 characteristics respectively and being responsive to the second difference signal for generating second different prediction signals for the second difference signal, respectively;

a plurality of second subtracters for generating second prediction-error signals representing differences between the  
15 second difference signal and the second different prediction signals, respectively; and

means for selecting a second minimum prediction-error signal representative of a smallest difference from among the second prediction-error signals.

20

8. An audio signal encoding apparatus as recited in claim 7, further comprising means for generating a variable-rate bit stream in response to the first minimum prediction-error signal and the second minimum prediction-error signal.

25

9. An audio signal decoding apparatus for processing a first



minimum prediction-error signal and a second minimum prediction-error signal which are generated by an audio signal encoding apparatus comprising means for selecting a first audio signal and a second audio signal from among signals composing a multi-channel audio signal; means for adding the first audio signal and the second audio signal into an addition-result signal; means for subtracting the first audio signal from the second audio signal, and generating a subtraction-result signal; means responsive to the addition-result signal for generating a first difference signal representing a difference in the addition-result signal; means responsive to the subtraction-result signal for generating a second difference signal representing a difference in the subtraction-result signal; a plurality of first predictors having different prediction characteristics respectively and being responsive to the first difference signal for generating first different prediction signals for the first difference signal, respectively; a plurality of first subtracters for generating first prediction-error signals representing differences between the first difference signal and the first different prediction signals, respectively; means for selecting a first minimum prediction-error signal representative of a smallest difference from among the first prediction-error signals; a plurality of second predictors having different prediction characteristics respectively and being responsive to the second difference signal for generating second different prediction signals for the second difference signal, respectively; a plurality of second subtracters for generating second prediction-error signals representing differences

between the second difference signal and the second different prediction signals, respectively; and means for selecting a second minimum prediction-error signal representative of a smallest difference from among the second prediction-error signals; the  
5 audio signal decoding apparatus comprising:

means for recovering the addition-result signal from the first minimum prediction-error signal;

means for recovering the subtraction-result signal from the second minimum prediction-error signal; and

10 means for recovering the first audio signal and the second audio signal from the recovered addition-result signal and the recovered subtraction-result signal.

10. A method comprising the steps of:

15 selecting a first audio signal and a second audio signal from among signals composing a multi-channel audio signal;

adding the first audio signal and the second audio signal into an addition-result signal;

subtracting the first audio signal from the second audio signal,  
20 and generating a subtraction-result signal;

generating a first difference signal representing a difference in the addition-result signal;

generating a second difference signal representing a difference in the subtraction-result signal;

25 generating first different prediction signals for the first difference signal, respectively;

generating first prediction-error signals representing differences between the first difference signal and the first different prediction signals, respectively;

- 5        selecting a first minimum prediction-error signal  
representative of a smallest difference from among the first  
prediction-error signals;

generating second different prediction signals for the second difference signal, respectively;

- 10       generating second prediction-error signals representing  
differences between the second difference signal and the second  
different prediction signals, respectively;

selecting a second minimum prediction-error signal  
representative of a smallest difference from among the second  
prediction-error signals; and

- 15       transmitting the first minimum prediction-error signal and  
the second minimum prediction-error signal to a communication  
line.

11.    An optical recording medium storing formatted information of  
20    a first minimum prediction-error signal and a second minimum  
prediction-error signal which are generated by an audio signal  
encoding apparatus comprising means for selecting a first audio  
signal and a second audio signal from among signals composing a  
multi-channel audio signal; means for adding the first audio signal  
25    and the second audio signal into an addition-result signal; means for  
subtracting the first audio signal from the second audio signal, and

generating a subtraction-result signal; means responsive to the addition-result signal for generating a first difference signal representing a difference in the addition-result signal; means responsive to the subtraction-result signal for generating a second  
5 difference signal representing a difference in the subtraction-result signal; a plurality of first predictors having different prediction characteristics respectively and being responsive to the first difference signal for generating first different prediction signals for the first difference signal, respectively; a plurality of first  
10 subtracters for generating first prediction-error signals representing differences between the first difference signal and the first different prediction signals, respectively; means for selecting a first minimum prediction-error signal representative of a smallest difference from among the first prediction-error signals; a plurality  
15 of second predictors having different prediction characteristics respectively and being responsive to the second difference signal for generating second different prediction signals for the second difference signal, respectively; a plurality of second subtracters for generating second prediction-error signals representing differences  
20 between the second difference signal and the second different prediction signals, respectively; and means for selecting a second minimum prediction-error signal representative of a smallest difference from among the second prediction-error signals.

25 12. A method of network-based transmission, comprising the steps of:

selecting a first audio signal and a second audio signal from among signals composing a multi-channel audio signal;

adding the first audio signal and the second audio signal into an addition-result signal;

5        subtracting the first audio signal from the second audio signal, and generating a subtraction-result signal;

generating a first difference signal representing a difference in the addition-result signal;

generating a second difference signal representing a  
10    difference in the subtraction-result signal;

generating first different prediction signals for the first difference signal, respectively;

generating first prediction-error signals representing differences between the first difference signal and the first different  
15    prediction signals, respectively;

selecting a first minimum prediction-error signal representative of a smallest difference from among the first prediction-error signals;

generating second different prediction signals for the second  
20    difference signal, respectively;

generating second prediction-error signals representing differences between the second difference signal and the second different prediction signals, respectively;

selecting a second minimum prediction-error signal  
25    representative of a smallest difference from among the second prediction-error signals; and

transmitting the first minimum prediction-error signal and the second minimum prediction-error signal to a communication line.